

Serial No. 10/629,614
Amendment dated December 9, 2005

Atty. Docket No. 277/006
Reply to Office action of September 9, 2005

Amendments to the Claims:

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) A printed circuit board integrated with a two-axis fluxgate sensor, comprising:

a first soft magnetic core formed lengthwise in a first axial direction and forming a rectangular-ring;

a first excitation coil formed of a metal film and wound around the first soft magnetic core;

a first pick-up coil formed of a metal film and wound around the first soft magnetic core and the first excitation coil;

a second soft magnetic core formed lengthwise in a second axial direction, the second axial direction being perpendicular to the first axial direction and forming a rectangular-ring;

a second excitation coil formed of a metal film and wound around the second soft magnetic core; and

a second pick-up coil formed of a metal film and wound around the second soft magnetic core and the second excitation coil[;];

wherein the printed circuit board includes a single dielectric core and the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the printed circuit board and the second excitation coil, the second pick-up coil, and the second soft magnetic core are disposed on a second side of the printed circuit board. and

~~a pad for establishing conductivity between the first and second excitation coils and the first and second pick-up coils and an external circuit.~~

Serial No. 10/629,614

Amendment dated December 9, 2005

Atty. Docket No. 277/006

Reply to Office action of September 9, 2005

2.-16. (Canceled).

17. (Currently Amended) The printed circuit board as claimed in claim 1, wherein each of the first and second soft magnetic cores comprises four co-planar bars forming the rectangular ring ~~comprise a rectangular ring formed on a same plane.~~

18. (Currently Amended) The printed circuit board as claimed in claim 17, wherein each of the first and second excitation coils has ~~has~~ ~~[[have]]~~ a structure of winding ~~[[both]]~~ at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an axial direction and substantially in a solenoid pattern.

19. (Currently Amended) The printed circuit board as claimed in claim 18, wherein each of the first and second pick-up coils has ~~has~~ ~~[[have]]~~ a structure of winding ~~[[both]]~~ the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an axial direction together and substantially in a solenoid pattern.

20. (Currently Amended) The printed circuit board as claimed in claim 19, wherein the first and second excitation and pick-up coils and the first and second excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an alternating fashion.

Serial No. 10/629,614

Atty. Docket No. 277/006

Amendment dated December 9, 2005

Reply to Office action of September 9, 2005

21. (Currently Amended) The printed circuit board as claimed in claim 20, wherein each coil of the first and second excitation coils and each coil of the first and second pick-up coils ~~[[are]]~~ is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring ~~rectangular ring~~ therebetween.

22. (Currently Amended) The printed circuit board as claimed in claim 18, wherein each of the first and second pick-up coils has ~~[[have]]~~ a structure of winding ~~[[both]]~~ the at least two opposing sides of the rectangular ring ~~rectangular ring~~ substantially in a solenoid pattern.

23. (Currently Amended) The printed circuit board as claimed in claim 22, wherein the first ~~and second~~ excitation and pick-up coils and the first ~~and second~~ excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an alternating fashion.

24. (Currently Amended) The printed circuit board as claimed in claim 23, wherein each coil of the first and second excitation coils and each coil of the first and second pick-up coils ~~[[are]]~~ is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring ~~rectangular ring~~ therebetween.

25. (Currently Amended) The printed circuit board as claimed in claim 17, wherein each of the first and second excitation coils are wound around ~~[[both]]~~ at least two opposing

Serial No. 10/629,614

Amendment dated December 9, 2005

Atty. Docket No. 277/006

Reply to Office action of September 9, 2005

sides of the rectangular ring ~~rectangular ring~~ in an axial direction ~~alternately~~ and substantially in a figure-eight pattern.

26. (Currently Amended) The printed circuit board as claimed in claim 25, wherein each of the first and second pick-up coils has ~~[[have]]~~ a structure of winding ~~[[both]]~~ the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in axial direction together and substantially in a solenoid pattern.

27. (Currently Amended) The printed circuit board as claimed in claim 26, wherein the first ~~and second~~ excitation and pick-up coils and the ~~first and second~~ excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an alternating fashion.

28. (Currently Amended) The printed circuit board as claimed in claim 27, wherein each coil of the first and second excitation coils and each coil of the first and second pick-up coils ~~[[are]]~~ is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring ~~rectangular ring~~ therebetween.

29. (Currently Amended) The printed circuit board as claimed in claim 25, wherein each of the first and second pick-up coils has ~~[[have]]~~ a structure of winding ~~[[both]]~~ the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in axial direction and substantially in a solenoid pattern.

Serial No. 10/629,614

Atty. Docket No. 277/006

Amendment dated December 9, 2005Reply to Office action of September 9, 2005

30. (Currently Amended) The printed circuit board as claimed in claim 29, wherein the first ~~and second~~ excitation and pick-up coils and the first ~~and second~~ excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring ~~rectangular ring~~ in an alternating fashion.

31. (Currently Amended) The printed circuit board as claimed in claim 30, wherein each coil of the first and second excitation coils and each coil of the first and second pick-up coils ~~[[are]]~~ is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring ~~rectangular ring~~ therebetween.

32-64. (Cancelled)